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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,478	06/03/2005	Bunshi Fugetsu	05345/MJC	3245
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EXAMINER MCCRACKEN, DANIEL				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/537,478

Applicant(s)

FUGETSU, BUNSHI

Examiner

DANIEL C. MCCracken

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date 6/3/2005, 6/29/2005, 8/2/2005, 4/20/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

The Examiner has considered the relevance of all foreign patent documents insofar as the translated abstract indicates. "The duty of candor does not require that the applicant translate every foreign reference, but only that the applicant refrain from submitting partial translations and concise explanations that it knows will misdirect the examiner's attention from the reference's relevant teaching." *Semiconductor Energy Laboratory Co. v. Samsung Electronics Co.*, 204 F.3d 1368, 1378, 54 USPQ2d 1001 1008 (Fed. Cir. 2000).

Remarks

Applicants preliminary amendment dated 7/29/2005 has been received and will be entered. Claims 1-15 are pending.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 11 is rejected under 35 U.S.C. 101 because the claimed recitation of a(n implied) use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 provides for the use of the "water-solubilizing agent," but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process

applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. Regarding claim 5, the phrases "for example" and "such as" are unclear and are ignored and do not limit the claim in any respect for the purpose of the rejections below. See MPEP § 2173.05(d). Correction is requested.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The reference teaches each and every limitation of the rejected claims. The pinpoint citations are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

Claims 1-5 and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,015,686 to Dubensky, Jr. et al.

With respect to Claims 1-5 and 10-11, the claimed compounds are taught. *See* (Dubensky 159: 35 *et seq.*). *This is all that the claims require*, and as such, any claimed properties are expected to be necessarily taught. "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed

product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). Note that the “agent for nanocarbons” language of Claim 1 and further defining the nanocarbons in Claim 11 are statements of intended use, which are not accorded patentable weight.

Claims 1-2, 4-7, 10-12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Bandyopadhyaya, et al., *Stabilization of Individual Carbon Nanotubes in Aqueous Solutions*, Nano Letters 2002; 2(1): 25-28 (hereinafter “Bandyopadhyaya at ___”) in view of Dullavet, et al., *Meaning of molecular weight gum arabic measurements*, Polymer Bulletin 1989; 21: 517-521 (hereinafter “Dullavet at ___”) to show a state of fact¹.

With respect to Claim 1, Bandyopadhyaya teaches a water solubilizing agent for “nanocarbons,” Gum Arabic. *See* (Bandyopadhyaya at 25, col. 2 – 26, col. 1) (noting the “solubilizing” taught in Fig 2.). Gum Arabic has the claimed molecular weight. *See* (Dullavet at 517). Given the “solubilizing” properties and molecular weight is taught, it is expected that whatever the “globular micelle” limitation means is taught by Bandyopadhyaya. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on

inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. In *re* Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In *re* Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). As to Claim 2, Applicants – by claiming “phospholipid” and “non-phospholipid” surfactants have effectively claimed every surfactant. Bandyopadhyaya teaches several, but in particular Gum Arabic. *See* (Bandyopadhyaya at 26, col. 1). As to Claim 4, Gum Arabic comes from the Acacia Senegal tree, a vegetable. (Bandyopadhyaya at 25, col. 2). As to Claim 5, notwithstanding the ambiguities noted above, Gum Arabic is a water-soluble polysaccharide. *Id.* As to Claim 6, an aqueous solution is taught. *Id.* Claim 7 reads on water, taught by Bandyopadhyaya. *Id.* As to Claim 10, carbon nanotubes are taught. *Id.* Note however that Claim 10 does not require any “nanocarbon.” While there is technically antecedent basis in Claim 1, the “for nanocarbons” language (as noted above) is a statement of intended use which is accorded no patentable weight. Claim 1 is a composition claim - it is immaterial whether the composition “solubilizes” nanotubes, polishes shoes or cures baldness. As to Claim 11, notwithstanding the ambiguities noted above, it would appear as if the Gum Arabic of Bandyopadhyaya is used for “refining” nanocarbon.

With respect to Claims 12 and 14, Bandyopadhyaya teaches dissolving the nanocarbon in an aqueous solution. *See e.g.* (Bandyopadhyaya at 26, col. 1).

¹ Multiple reference 35 U.S.C. 102 rejections are proper when extra references are cited to explain the meaning of a

Claims 1-2, 5-6, 12 and 14 are rejected under 35 U.S.C. 102(a) as being anticipated by Nakashima, et al, *DNA Dissolves Single-walled Carbon Nanotubes in Water*,” Chemistry Letters 2003; 32(5): 456-457 (hereinafter “Nakashima at ___”).

With respect to Claims 1-2 and 5-6, Nakashima teaches DNA solubilized nanotubes in aqueous solutions. *See* (Nakashima at 456, col. 1). Given that DNA is typically regarded as a very large polymer – and the fact that it is claimed and disclosed – it is expected that the molecular weight and other properties of Claim 1 are taught. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). With respect to Claims 12 and 14, a method for solubilizing the nanotubes is taught. *See* (Nakashima at 456, col. 1).

Claims 1-2, 5-6, 12 and 14 are rejected under 35 U.S.C. 102(a) as being anticipated by Okuzono, *DNA Kayoka Carbon Nanotube Kozo to Tokushei*, Polymer Preprints, Japan Yokoshu 2003; 52(13): 3732-3733 (hereinafter “Okuzono at ___”).

With respect to Claims 1-2 and 5-6, Okuzono teaches DNA solubilized nanotubes in aqueous solutions. *See* (Okuzono, translated page). Given that DNA is typically regarded as a very large polymer – and the fact that it is claimed and disclosed – it is expected that the molecular weight and other properties of Claim 1 are taught. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. In *re* Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In *re* Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). With respect to Claims 12 and 14, a method for solubilizing the nanotubes is taught. *See* (Okuzono, translated page).).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The references cited teach each and every limitation of the rejected claims. The pinpoint citations are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found. As to the rejection under 35 U.S.C. §§ 102/103, where the applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the Examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. See MPEP 2112 III. (discussing 102/103 rejections).

With respect to the third *Graham v. Deere* inquiry, the Examiner resolves the level of ordinary skill to be high, presumably a PhD level chemist with industry or research experience. Support for this finding can be found in any of the references of record, Including Applicant's IDS.

Claims 1-5 and 10-11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 6,015,686 to Dubensky, Jr. et al.

The preceding discussion of Dubensky accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 1- 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,015,686 to Dubensky, Jr. et al.

The preceding discussion of Dubensky accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. With respect to Claim 6, to the extent Dubensky *may* not teach *in haec verba* an aqueous solution, adding water is an obvious expedient for any number of reasons, for example diluting to the proper concentration.

Claims 1-2, 4-7, 10-12 and 14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bandyopadhyaya, et al., *Stabilization of Individual Carbon Nanotubes in Aqueous Solutions*, Nano Letters 2002; 2(1): 25-28 in view of Dullavet, et al., *Meaning of molecular weight gum arabic measurements*, Polymer Bulletin 1989; 21: 517-521 to show a state of fact.

The preceding discussion of Bandyopadhyaya and Dullavet accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bandyopadhyaya, et al., *Stabilization of Individual Carbon Nanotubes in Aqueous Solutions*, Nano Letters 2002; 2(1): 25-28 in view of Dullavet, et al., *Meaning of molecular weight gum*

arabic measurements, Polymer Bulletin 1989; 21: 517-521 as applied to claims 12 and 14 above, and further in view of US 5,641,466 to Ebbesen, et al.

The preceding discussion of Bandyopadhyaya and Dullavet accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. To the extent Bandyopadhyaya may not disclose the acid purification step of Claims 13 and 15, the Examiner takes official notice that this procedure is old, known, and common. In support of taking official notice (i.e. in making sure there is “substantial evidence”) on the record, the Examiner cites to Ebbesen. *See generally* (Ebbesen 3: 20 *et seq.*) (noting the use of acids). One would be motivated to purify the nanotubes as taught by Ebbesen to, among other reasons, *remove impurities*.

Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bandyopadhyaya, et al., *Stabilization of Individual Carbon Nanotubes in Aqueous Solutions*, Nano Letters 2002; 2(1): 25-28 in view of Dullavet, et al., *Meaning of molecular weight gum arabic measurements*, Polymer Bulletin 1989; 21: 517-521 to show a state of fact as applied to claims 1 above, and further in view of US 6,331,262 to Haddon and US 6,683,783 to Smalley, et al.

The preceding discussion of Bandyopadhyaya and Dullavet accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. With respect to Claims 6-9 the extent Bandyopadhyaya may not disclose the addition of lithium and persulfate, Haddon does. *See* (Haddon 9: 30 *et seq.*) (lithium) *and* (Haddon 6: 31) (persulfate – note also the aqueous

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solution). One would be motivated to use a persulfate to purify the nanotubes, as taught by Haddon. One would be motivated to dope the nanotubes with lithium for any number of reasons, for example a lithium ion battery, as taught by Smalley. (Smalley 31: 52 *et seq.*) (noting that lithium doped nanotubes are useful in batteries).

Claims 1-2, 5-6, 12 and 14 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nakashima, et al, *DNA Dissolves Single-walled Carbon Nanotubes in Water*,” Chemistry Letters 2003: 32(5): 456-457.

The preceding discussion of Nakashima accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashima, et al, *DNA Dissolves Single-walled Carbon Nanotubes in Water*,” Chemistry Letters 2003: 32(5): 456-457 as applied to claims 12 and 14 above, and further in view of US 5,641,466 to Ebbesen, et al.

The preceding discussion of Nakashima accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. To the extent Nakashima may not disclose the acid purification step of Claims 13 and 15, the Examiner takes official notice that this procedure is old, known, and common. In support of taking official notice (i.e. in making sure there is “substantial evidence”) on the record, the Examiner cites to Ebbesen. *See generally* (Ebbesen 3:

20 *et seq.*) (noting the use of acids). One would be motivated to purify the nanotubes as taught by Ebbesen to, among other reasons, *remove impurities*.

Claims 1-2, 5-6, 12 and 14 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Okuzono, *DNA Kayoka Carbon Nanotube Kozo to Tokushei*, Polymer Preprints, Japan Yokoshe 2003; 52(13): 3732-3733.

The preceding discussion of Okuzono accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuzono, *DNA Kayoka Carbon Nanotube Kozo to Tokushei*, Polymer Preprints, Japan Yokoshe 2003; 52(13): 3732-3733 as applied to claims 12 and 14 above, and further in view of US 5,641,466 to Ebbesen, et al.

The preceding discussion of Okuzono accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. To the extent Okuzono may not disclose the acid purification step of Claims 13 and 15, the Examiner takes official notice that this procedure is old, known, and common. In support of taking official notice (i.e. in making sure there is "substantial evidence") on the record, the Examiner cites to Ebbesen. *See generally* (Ebbesen 3: 20 *et seq.*) (noting the use of acids). One would be motivated to purify the nanotubes as taught by Ebbesen to, among other reasons, *remove impurities*.

Conclusion

The following is considered relevant to Applicants disclosure:

1. US 2008/0023396 to Fugetsu

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCracken whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel C. McCracken/
Daniel C. McCracken
Examiner, Art Unit 1793
DCM

/Stuart Hendrickson/
Stuart L. Hendrickson
Primary Examiner